REMARKS/ARGUMENTS

This is a Response to the Office Action mailed October 25, 2006, in which a three (3) month Shortened Statutory Period for Response has been set, due to expire January 25, 2007. Six (6) claims, including one (1) independent claim, were paid for in the application. Claims 4-6 have been previously canceled without prejudice. Claim 1 is currently amended. No new matter has been added to the application. No fee for additional claims is due by way of this Amendment. The Director is authorized to charge any additional fees due by way of this Amendment, or credit any overpayment, to our Deposit Account No. 19-1090. Claims 1-3 are pending.

Rejections Under 35 U.S.C. § 103

Claims 1-2 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Chou et al., hereinafter Chou, (W. Chou, M.A. Neifeld, 'Interleaving and error correction in volume holographic memory systems', Appl. Opt., vol. 37, no. 29, October 10, 1998, pp. 6951-6968) in view of Curtis et al., hereinafter Curtis, (U.S. Patent No. 6,163,391) and Bernal et al, hereinafter Bernal, (M.P. Bernal, G.W. Burr, H. Coufal, M. Quintanilla, 'Noise in high-areal-density holographic data storage systems', Opt. Soc. America, Washington D.C., USA, May 1998, pp.21-22).

The illustrative and non-limiting embodiments of Applicant's invention are directed to a holographic recording and reproducing apparatus for recording data as phase information of light in a holographic recording medium by projecting a signal beam and a reference beam onto the holographic recording medium. A pinhole is disposed at a confocal point of a Fourier transform lens and a reverse Fourier transform lens without having to reposition the confocal point prior to projecting the signal and reference beams. The pinhole is disposed either between the holographic recording medium and the Fourier transform lens or between the holographic recording medium and the reverse Fourier transform lens. The focal length of the Fourier transform lens remains unchanged even prior to projecting the signal beam and reference beam. The pinhole is disposed at the confocal point of the Fourier transform lens and the reverse Fourier transform so as to serve as a spatial filter to the holographic recording

and reproducing apparatus and remove a noise component when data are recorded or data are reproduced.

Amended claim 1 recites, *inter alia*, "...and a pinhole disposed at a confocal point of the Fourier transform lens and the reverse Fourier transform lens without having to reposition the confocal point prior to projecting the signal beam and the reference beam...the pinhole being disposed between the holographic recording medium and the Fourier transform lens or between the holographic recording medium and the reverse Fourier transform lens" (Emphasis added.)

Curtis teaches a holographic recording apparatus including a transforming lens 390 or a power element 405 that adds convergence or divergence, respectively, to an object beam before the object beam enters the Fourier transform lens. The transforming lens 390 or the power element 405 is disposed in the path of the object beam at a position prior to the Fourier transform lens 390, thereby repositioning the dc focus 380 (focal point) either behind a Fourier transform plane 385 (if the diverging power element 405 is used) or in front of the Fourier transform plane 385 (if the converging transform lens 390 is used) (See figures 10-11 and column 11, lines 1-20 of Curtis). Thus, prior to recording and reproducing information, the dc focus 380 is repositioned to a position either behind the Fourier transform plane 385 or in front of the Fourier transform plane 385.

Curtis does not disclose, teach or suggest projecting the signal beam and reference beam without prior repositioning of the confocal point, as disclosed in amended independent claim 1. Instead, Curtis teaches repositioning of the focal length prior to recording and reproducing information so that the dc focus 380 is positioned either behind of or in front of the Fourier transform plane 385. Curtis further lacks a teaching of an aperture or a pinhole. Thus, Curtis does not disclose, teach or suggest a pinhole disposed at a confocal point of the Fourier transform lens and the reverse Fourier transform lens without having to reposition the confocal point prior to projecting the signal beam and the reference beam nor having the pinhole disposed between the holographic recording medium and the Fourier transform lens or between the holographic recording medium and the reverse Fourier transform lens, as recited in claim 1.

Bernal and Chou, alone or in combination, fail to cure the deficiencies of Curtis. Bernal teaches that both the holographic recording material and aperture are disposed at the

Fourier plane. As illustrated in Fig. 1 of Bernal, the Fourier plane is located at the focal point of lenses L1 and L2. Thus, Bernal does not teach or suggest having the aperture located either between the holographic recording medium and the Fourier transform lens, or between the holographic recording medium and the reverse Fourier transform lens.

As noted on page 8 of the present Office Action, Chou fails to disclose "a pinhole disposed at a confocal point of the Fourier transform lens and the reverse Fourier transform lens." Instead, Chou teaches a storage medium (recording medium) recording an interference pattern between object and reference beams at the confocal point of lens 1 and lens 2 (Figure 1). Thus, Chou does not teach, disclose or suggest having the pinhole located either between the holographic recording medium and the Fourier transform lens, or between the holographic recording medium and the reverse Fourier transform lens. Consequently, Bernal and Chou, whether alone or in combination, fail to cure the deficiencies of Curtis.

Curtis, Bernal and Chou do not teach or suggest all the limitations of independent claim 1. Thus, claim 1 is allowable as is claim 2, which depends therefrom.

Claim 3 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Chou in view of Curtis and Bernal.

As discussed above, Curtis teaches repositioning the dc focus 380 (focal point) either behind the Fourier transform lens 390 by way of the power element 405 or in front of the Fourier transform lens 390 by way of the transforming lens 390, prior to projecting the signal beam and the reference beam. Curtis further lacks a teaching of an aperture or a pinhole. Thus, Curtis does not disclose, teach or suggest a pinhole disposed at a confocal point of the Fourier transform lens and the reverse Fourier transform lens without having to reposition the confocal point prior to projecting the signal beam and the reference beam nor having the pinhole disposed between the holographic recording medium and the Fourier transform lens or between the holographic recording medium and the reverse Fourier transform lens, as recited in claim 1.

As further discussed above, Bernal and Chou, whether alone or in combination, fail to cure the deficiencies of Curtis. Thus, Curtis, Bernal and Chou do not teach or suggest all the limitations of claim 1. Consequently, claim 1 is allowable as is claim 3, which depends therefrom.

Claims 1-2 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Chou, in view of Tanaka et al U.S. Patent No. 6,301,028 (hereinafter "Tanaka") and Bernal.

As noted on page 8 of the present Office Action, Chou fails to disclose "a pinhole disposed at a confocal point of the Fourier transform lens and the reverse Fourier transform lens." Instead, Chou teaches a storage medium (recording medium) recording an interference pattern between object and reference beams at the confocal point of lens 1 and lens 2 (Figure 1). Thus, Chou does not disclose, teach or suggest a pinhole disposed at a confocal point of the Fourier transform lens and the reverse Fourier transform lens without having to reposition the confocal point prior to projecting the signal beam and the reference beam nor having the pinhole disposed between the holographic recording medium and the Fourier transform lens or between the holographic recording medium and the reverse Fourier transform lens, as recited in claim 1.

Tanaka and Bernal do not cure the deficiencies of Chou. Tanaka teaches a mask 50 disposed in the optical path of a signal light beam so that an optical intensity distribution of the signal light beam incident on a volume holographic memory 10 is partly covered (column 6, lines 18-26). Thus, the mask 50 serves to partly block the signal light beam.

The pinhole, of the present application, serves to remove a noise component from a reproduced beam when data are reproduced and remove a noise component from a signal beam when data are recorded. In particular, pinhole 301 serves to remove the noise component from the reproduced beam when the pinhole 301 is disposed at the confocal point of the Fourier transform lens 105 and the reverse Fourier transform lens 106 and between the holographic recording medium 111 and the reverse Fourier lens 106 (Fig. 3 and page 12 lines 14-18). Pinhole 401 serves to remove the noise component from the signal beam when the pinhole 401 is disposed at the confocal point of the Fourier transform lens 105 and the reverse Fourier transform lens 106 and between the holographic recording medium 111 and the Fourier transform lens 105 (Fig. 4 and page 13, lines 2-6). Thus, the mask 50 of Tanaka is clearly not equivalent to the pinhole 301,401 of the present application.

Consequently, Tanaka does not disclose, teach or suggest a pinhole disposed at a confocal point of the Fourier transform lens and the reverse Fourier transform lens or having the

pinhole disposed between the holographic recording medium and the Fourier transform lens or between the holographic recording medium and the reverse Fourier transform lens.

Bernal teaches that both the holographic recording material and aperture are disposed at the Fourier plane. As illustrated in Fig. 1 of Bernal, the Fourier plane is located at the focal point of lenses L1 and L2. Thus, Bernal does not disclose, teach or suggest having the aperture located either between the holographic recording medium and the Fourier transform lens, or between the holographic recording medium and the reverse Fourier transform lens.

Consequently, Tanaka and Bernal, alone or in combination, fail to cure the deficiencies of Chou. Thus, independent claim 1 is allowable as is dependent claim 2, which depends therefrom.

Claim 3 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Chou, in view of Tanaka and Bernal.

As discussed above, Chou does not disclose, teach or suggest a pinhole disposed at a confocal point of the Fourier transform lens and the reverse Fourier transform lens without having to reposition the confocal point prior to projecting the signal beam and the reference beam nor having the pinhole disposed between the holographic recording medium and the Fourier transform lens or between the holographic recording medium and the reverse Fourier transform lens, as recited in claim 1.

As further discussed above, neither Tanaka nor Bernal, whether alone or in combination cure the deficiencies of Chou. Thus, independent claim 1 is allowable as is dependent claim 3, which depends therefrom.

Conclusion

Overall, the cited references do not singly, or in any motivated combination, teach or suggest the claimed features of the embodiments recited in amended independent claim 1 and thus such claim is allowable. Because the remaining claims depend from allowable independent claim 1, and also because they include additional limitations, such claims are likewise allowable. If the undersigned attorney has overlooked a relevant teaching in any of the references, the Examiner is requested to point out specifically where such teaching may be found.

In light of the above amendments and remarks, Applicant respectfully submits that all pending claims are allowable. Applicant, therefore, respectfully requests that the Examiner reconsider this application and timely allow all pending claims. Examiner Lavarias is encouraged to contact Mr. Boller by telephone to discuss the above and any other distinctions between the claims and the applied references, if desired. If the Examiner notes any informalities in the claims, he is encouraged to contact Mr. Boller by telephone to expediently correct such informalities.

Respectfully submitted,

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